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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,894	11/26/2003	Prathyusha K. Salla	132958-3/YOD (GEMS:0263)	1160

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EXAMINER	
MEHTA, PARIKHA SOLANKI	

ART UNIT	PAPER NUMBER
3737	

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08/26/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/723,894	SALLA ET AL.	
	Examiner	Art Unit	
	PARIKHA S. MEHTA	3737	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 May 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: the specification recites, in various places, both "motion correction factors 106" and "motion compensation factors 106". Applicant is advised to amend the specification to recite "motion compensation factors" throughout the entire disclosure in order to maintain consistency with the claim language.

Appropriate correction is required.

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

3. The abstract of the disclosure is objected to because it exceeds 150 words. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 1-4, 9-12, 17-20, and 25-28 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1, 2, 9, 10, 17, 18, 25, and 26 are directed toward a method of processing image data, the steps of which comprise the mere manipulation of electromagnetic signals. Such manipulation of electromagnetic signals has been previously held to constitute a judicial exception which may only be deemed statutory only if the claimed method(s) produce a useful, tangible and concrete result and are sufficiently tied to another statutory class. The instant claims are not sufficiently tied to an apparatus or other statutory class.

Similarly, the computer programs of claims 3, 4, 1, 12, 19, 20, 27 and 28 constitute nothing more than methods which fail to produce a concrete, tangible and useful result; that they are embodied on computer readable media does not cure this deficiency.

For further reference regarding the definition of statutory subject matter as set forth by the USPTO, Examiner directs Applicant's attention to the USPTO published Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility published on 26 October 2005.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1-32 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claims 1-32 recite "motion compensation factors" which were not described in the disclosure in sufficient detail such that one of ordinary skill in the art would be reasonably apprised of how to use and make the claimed invention. The specification lacks any and all specific description of exactly what a motion compensation factor is, or precisely how it is derived, other than the generalized statement that the determination of the factors "may involve modeling the anticipated motion" (Specification p. 18 paragraph 3). For the purposes of further examination herein, Examiner interprets "motion compensation factor" to mean any quality or characteristic related to motion of the imaged objects.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Spraggins et al (US Patent No. 4,961,426), hereinafter Spraggins ('426), previously of record.

Regarding claims 1, 3, 5 and 7, Spraggins ('426) discloses a computerized method and system for acquiring a set of NMR image data of the heart (col. 2 lines 43-44, col. 3 lines 13-33) and acquiring motion and timing data for the lungs (col. 4 lines 3-8) from separate non-imaging NMR data (i.e., "a set of motion data for two or more organs from at least one of one or more types of electrical sensors") (col. 4 lines 46-47). Spraggins ('526) additionally discloses means and steps for processing the motion data to extract gating data (i.e., "two or more retrospective gating points") (col. 2 lines 18-20, col. 6 lines 27-38) and for peak detection (i.e., "one or more motion compensation factors") (col. 5 lines 29-32, Fig. 6), as well as means and steps for processing a portion of the image data based on the retrospective gating points and motion compensation factor (col.2 lines 20-21. claim 1). Spraggins ('526) displays this portion of the image data (col. 2 lines 21-22).

Regarding claims 2, 4, 6 and 8, Spraggins ('426) discloses all features as previously discussed for claims 1 and 3. Spraggins ('426) also discloses means and steps for reconstructing the image data (col. 3 lines 13-33, Fig. 2).

10. Claims 1-8 are rejected under 35 U.S.C. 102(e) as being anticipated by Larson et al (US PG Pubs. No. 2004/0155653), hereinafter Larson ('653), previously of record.

Regarding claims 1 and 3, Larson ('653) discloses a computerized method for processing image data, including steps of acquiring a set of MR image data representative of the heart (Fig. 1, ¶ 0010, ¶ 0062, acquiring a time-varying motion signal for the lungs (i.e., "a set of motion data for two or more organs") (Abstract, ¶ 0014, 0044) from a separate non-imaging MR coil (i.e., "one or more types of

electrical sensors") (¶ 0023, 0039, 0058), wherein the motion and image data are acquired substantially concurrently (¶ 0023). Larson ('653) processes the time-varying motion signal to extract the start and end time of a period of interest in the cardiac cycle (¶ 0048) (i.e., "two or more retrospective gating points") and a peak, phase or rate of change of the motion signal (i.e., "one or more motion compensation factors"). Larson ('653) processes a portion of the image data based on the retrospective gating points and the peak, phase or rate of change of the motion signal (¶ 0049, 0050) and subsequently displays the image (claim 1).

Regarding claims 2 and 4, Larson ('653) discloses all features of the present invention as previously discussed for claims 1 and 3. Larson ('653) additionally discloses steps for reconstructing the image data from raw k-space data (¶ 0042).

Regarding claims 5-8, Larson ('653) discloses using a conventional MR system to perform the retrospective cardiac image gating method (¶ 0053). It is known that, in the state of the art at the time of invention, a conventional MR system included an imager, data acquisition circuitry for acquiring and processing motion image signals, system control circuitry for operating the imager, an operator workstation for communicating with the system control circuitry, a sensor-based motion measurement system as claimed in the instant application, and computer readable media containing programs for operating all of the above-noted components.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner

to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 9-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Larson ('653) in view of Rogers (US Patent No. 5,477,144), hereinafter Rogers ('144), previously of record.

Regarding claims 9-24, Larson ('653) teaches all features of the present invention as previously discussed for claims 1-8. Larson ('653) further teaches that cardiac motion image data may be synchronized with respiratory motion data (¶ 0050). Larson ('653) does not provide non-electrical sensors for acquiring the cardiac motion image data.

In the same field of endeavor, Rogers ('144) provides a method and system for retrospectively-gated cardiac MR imaging with motion artifact correction, including the synchronization of respiratory motion data with cardiac motion data, as acquired by a pressure transducer, an acoustic microphone, a piezoelectric crystal transducer, all of which are non-electrical (col. 5 lines 53-63). Larson ('653) teaches that the use of cardiac motion sensors other than an ECG during imaging is desirable, because it avoids the problem of interference between the cardiac motion sensors and the magnetic field of the MR imaging system (¶ 0003, 0013). In light of the motivation provided by Larson ('653), it would have been obvious to one of ordinary skill in the art at the time of invention to modify the method and system of Larson ('653) to substitute the non-electrical cardiac motion sensors provided by Rogers ('144).

Regarding claims 25-32, the combination of Larson ('643) and Rogers ('144) as applied to claims 9-24 would yield the claimed invention having both electrical and non-electrical cardiac motion sensors if the sensors of Rogers ('144) were included with, instead of substituted for, the sensors of Larson ('643). It would have been obvious to one of ordinary skill in the art at the time of invention to augment the system and method of Larson ('643) by adding the non-electrical sensors of Rogers ('144) in order to obtain additional motion data to confirm the results obtained by the electrical sensors of Larson ('643).

14. Claims 9-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spraggins ('426) in view of Rogers ('144).

Regarding claims 9-24, Spraggins ('426) teaches all features of the present invention as previously discussed for claims 1-8, with the exception of non-electrical motion sensors.

In the same field of endeavor, Rogers ('144) provides a method and system for retrospectively-gated cardiac MR imaging with motion artifact correction, including the synchronization of respiratory

motion data with cardiac motion data, as acquired by a pressure transducer, an acoustic microphone, a piezoelectric crystal transducer, all of which are non-electrical (col. 5 lines 53-63). It would have been obvious to one of ordinary skill in the art at the time of invention to modify the method and system of Spraggins ('426) to substitute the non-electrical cardiac motion sensors provided by Rogers ('144) for the electrical sensor of Spraggins ('426) in order to achieve the claimed invention, to avoid any interference between the imager and motion sensor.

Regarding claims 25-32, the combination of Spraggins ('426) and Rogers ('144) as applied to claims 9-24 would yield the claimed invention having both electrical and non-electrical cardiac motion sensors if the sensors of Rogers ('144) were included with, instead of substituted for, the sensors of Spraggins ('426). It would have been obvious to one of ordinary skill in the art at the time of invention to augment the system and method of Spraggins ('426) by adding the non-electrical sensors of Rogers ('144) in order to obtain additional motion data to confirm the results obtained by the electrical sensors of Spraggins ('426).

Double Patenting

15. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

16. Claims 1-16 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-8 and 17-24 of copending Application No. 10/723,857.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the instant application are merely broader than those of the co-pending application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

17. Claims 17-32 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 17-32 of copending Application No. 10/723,857, in view of Rogers (US Patent No. 5,477,144). Although the conflicting claims are not identical, they are not patentably distinct from each other. Claims 17-32 of the co-pending application recite all limitations of claims 17-32 of the present invention, with the exception of specifying that the imager is an MR system and that the non-electrical sensor(s) is used to acquire cardiac motion data. In the same field of endeavor, Rogers ('144) teaches a system and method for retrospectively-gated cardiac MR imaging, using non-electrical sensors to acquire cardiac motion data (col. 5 lines 53-63). It would have been obvious to one of ordinary skill in the art at the time of invention to modify the system and methods of the co-pending application to employ an MR imager and non-electrical cardiac sensors, in order to eliminate interference between the magnetic field and the sensors, in view of the teachings of Rogers ('144).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

18. Applicant's arguments with respect to claims 1-32 have been considered but are not persuasive.

Applicant persists in challenging Examiner's interpretation of the term "sensor" (Remarks p. 23). Examiner maintains that the interpretation relied upon herein is in fact proper and quite reasonable in view of what is commonly known in the art of imaging. Further discussion of this argument was previously presented in the Non-Final rejection of 21 February 2008.

Applicant further contends that the Examiner has not properly correlated the motion data and image data of claims 1-8 to corresponding elements in the Larson reference (Remarks p. 26). Examiner directs Applicant's attention to paragraph 44 of the Larson reference, which was previously cited in several prior Office Actions, wherein the reference discloses timing information as being "a time-varying signal that corresponds to the motion", which constitutes the claimed motion data. In paragraph 35, Larson discloses MR imaging data, which constitutes the presently claimed image data.

As Applicant's arguments are found to be wholly unpersuasive for at least the foregoing reasons, claims 1-8 remain rejected in view of Larson and claims 9-32 remain rejected in view of Larson and Rogers as reiterated herein. The claims are additionally found to be unpatentable in view of Spraggins as presented herein.

Conclusion

19. In view of the new grounds of rejection presented herein, none of which were necessitated by an amendment to the claims, the present Office Action is non-final.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PARIKHA S. MEHTA whose telephone number is (571)272-3248. The examiner can normally be reached on M-F, 8 - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on 571.272.4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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